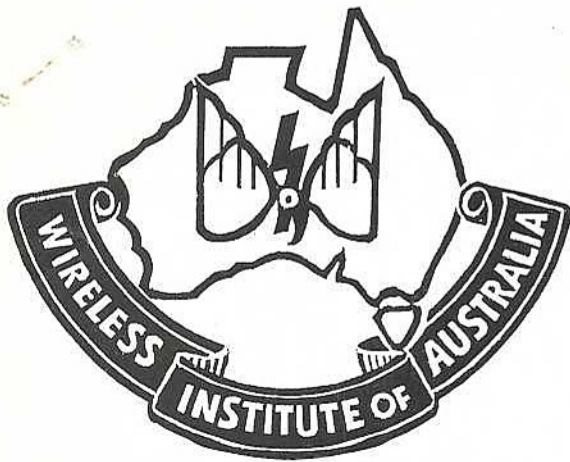


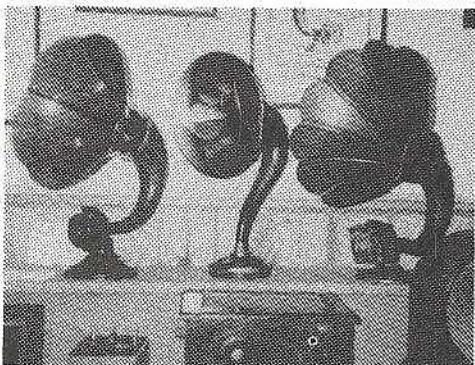
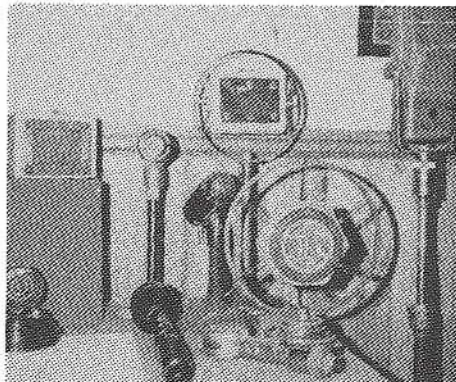
89/07 01 JUL 1989



B·A·R·G NEWS

STARTS AT MARCH

JULY/89.



© Monthly Newsletter of the
Ballarat Amateur Radio Group

89/07 02

BALLARAT AMATEUR RADIO GROUP INCORPORATED

OFFICERS 1988-1989

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			HOME	BUSINESS
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Technical Officer:	DICK ANTOZIEWICZ	VK3 AEX	32 3273	31 1818
Memb. Representative:	NEAL DAVIDSON	VK3 KQQ	35 9612	

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	PHIL SEDDON	VK3 AQM	31 5220	
	MURRAY FELSTEAD	VK3 AAI	41 2234	

B.A.R.G. meets on the **LAST FRIDAY** in every month except December at the Ballarat Education Centre, Hopetoun St., Ballarat at 7.30 p.m.

Committee meetings are held at the Education Centre on the Wednesday two weeks prior to the Club meeting at 7.30 p.m. Executive committee members are expected to attend and any club member with business for discussion is welcome.

All correspondence to: The Secretary, BARG Inc., P.O. Box 216E, Ballarat East, 3350.

Applications for Awards to: Maurie Batt, RSD, Rokewood Junction, 3351.



CNR. RING RD. & WESTERN HWY BALLARAT
(OPEN 10AM - 5 PM 7 DAYS A WEEK)

FEATURES

- GRAMOPHONES • VINTAGE RADIOS • VISITORS PARTICIPATION
- MEMORABILIA • AUDIO DISPLAYS • DEMONSTRATIONS • CRYSTAL SETS

The "Orpheus Radio Museum" is operated by Richard and Sonja Wilson.
The collection includes their private collection, the 3BA collection and other items on loan to the museum.
The museum is run with the idea of preserving the history of radio in Australia and making it accessible to the public.
If anyone has any information or items of interest to the museum, would they please contact, or write to, the "Orpheus Radio Museum" RSD B98, Ballarat 3352. Telephone (053) 34 2513.
Let the public enjoy your piece of Radio History.

89/07 03

MINUTES OF ANNUAL GENERAL MEETING HELD ON 30th JUNE 1989.

MEETING OPENED at 7.55pm by President John CFH who welcomed the 35 members and guests present.

APLOGIES VK3 CAZ,DMK,SE,PAP,YMW,DS,DKJ,PSD,NIZ.

MINUTES as printed and circulated were confirmed by KGC/BNC.

CORRESPONDENCE IN WIA re examination devolvment.
WIA accepting BARG offer to distribute inward QSL cards.

CORRESPONDENCE OUT RSGB requesting membership subscription rates.
AAPRA thanks for modem supplied for Packet Repeater.

TREASURERS REPORT. Harry KGL presented the auditted balance sheet for 1988-89. Current a/c \$892.03.VS&L \$2196.82. KGL/KGC.

CLUB NET Fred KQF is retiring as Net Co-ordinator after many years of service in this capacity for which the club thanked him,Fred in turn thanked those members that have supported the net.

EDUCATION OFFICER Ian AXH reported that the novice class at BRACE had now finished but he was going to continue tutoring the 5 students privately until the August exams.Ian presented a cheque for \$300.00 to the Club,Fees received for classes.

TECHNICAL COMMITTEE Dick AEX presented a written report on Committee activities which include construction of a 438-475mhz repeater VK3RBU,Upgrade of VK3 RBA, relocation of Digital repeater and upgrade of standby battery for VK3RBS.

NEWSLETTER. This year has seen an upgraded Newsletter with many advertisers contributing to its production costs.This is due to the efforts of Harry KGL and Bob BNC.Please support them with contributions and articles in the coming year.

AWARDS MANAGER Maury XEX reported a large downturn in applications for awards,only 4 in the last year.

QSL MANAGER Jeff PAP was overseas at time of this meeting but he stated his willingness to continue with the job and also take on the additional task of sorting inwards cards sent in bulkby the WIA.

CONVENTION Kevin WN has again agreed to be Convention Convener and a Committee comprising AEX,DOK,TCH,XEX,DFI,AXH,CFH,AAP,and KQQ was formed to assist him.

WICEN GORDON KGC reported that WICEN operators are required to assist with communications for the Nissen Car Rally on 22nd July.

GENERAL BUSINESS.David Burger VK3 BID donated a Crystal Control for the 432mhz Beacon,Moved AXH seconded KQF that letter of thanks be sent. carried.

Kevin WN reported that discount books can be obtained from Stewart Electronics,also technical magazines.
Neville CUH is going to run a novice class in Stawell.

CLUB DUES. Moved DOK seconded KGL that Club subscription remain at-
Full membership \$10.00 Associate \$7.50.Pensioner & Student \$5.00

continued overleaf.

89/07 04

MINUTES OF A.G.M. CONTINUED.

ELECTION OF OFFICERS 1989-90. President John declared all positions vacant and requested George DOK to call for nominations.

Judging from the lack of new nominations and the enthusiastic acclamation accorded to the committee members that agreed to serve a further year it can only be assumed that the members were satisfied with the performance of those officers in the past year.

Changes are- GORDON QGC from Vice President to President.
JOHN CFH from President to Immediate Past President.
IAN AXH to Vice President.
NEVILLE CUH to Net Co-ordinator.

MEETING RESUMED with President Gordon in the chair.

GENERAL BUSINESS Moved CFJ seconded KQF that Presidents report for 1988-89 as published be received. carried.

MEETING CLOSED at 9.50pm and the members adjourned to a supper of Pies Pasties and sausage rolls..

73s Jim CFB.

#####

PRESIDENT'S MESSAGE JULY 1989

After our A.G.M. last month, I would like to thank members for your confidence in me. I hope that at the end of the year you will still feel the same way.

As a relative new comer to Amateur Radio ranks I find that I have a lot to learn in the practical areas of the hobby and I believe that other members are in the same boat, therefore, after the committee meeting last Monday we have worked out a plan of speakers, demonstrations, tours and members involvement.

To this end I would ask all members to become involved as older members have the experience and practical know how to help the newer members. As is often shown, the best speakers come from your own club members!

The program for the July meeting will include a presentation on solar panels which should be interesting and informative.

The convention will again be held on the last weekend in October and chairman Kevin has things underway so we can expect a good weekend again and members can also expect to be asked for help and support in the future.

I look forward to a busy and interesting year for the club.

73's Gordon VK3KGC

NISSAN NIGHT CAR RALLY

Because of the wet weather over the last few weeks this event has been postponed to a date to be fixed.

The wet weather has caused the District Forester to ask the event be postponed, this was done on 11 July 1989.

The new date is proposed to be late September/early October depending on date approval from C.A.M.S.

89/7 05

CLARRY'S PACKET KORNER

Over deviating on packet?

From: Mike - G8TIC.

Many people are running either far too much deviation and/or mic gain. Not only do their packets sound poor quality, but they are often NOT decoded by other TNCs.

Very simply you need around 2.5kHz deviation on either single tone - the peak deviation of the transmitter is considerably higher when carrying data at 1200bps. The BER (Bit Error Rate) is considerably increased if the tones are greatly different in amplitude between high and low, or if they are compressed/limited/distorted by driving the MIC amplifier too hard.

There is no need for setting your TNC output level to be "louder" than others around you. Your transmitted tones should be clear, clean and free from distortion. You can simply use an oscilloscope and second receiver to look at/hear your transmissions and set the right level. You need around 2.5kHz deviation on either single tone.

Another good reason for keeping the deviation down is that some noise operated squelch circuits open very slowly when a signal is deviating at the maximum for the receiver - this is because distortion of the signal in the RX filter leads to noise sidebands in the IF which results in the RX seeing more noise, and hence less signal - this can lead to the start of packets "going missing" even with TXDELAY at 30 (which really shouldn't be the case).

If you run to near maximum deviation you will also show up more problems with frequency accuracy between your transmitter and the distant receiver.

Check your system today... is it really as good as it could be?

HINT: Try driving the TNC audio into the rig after the MIC amp/limiter.

HR AMSAT NEWS SERVICE BULLETIN 168.04 FROM AMSAT HQ
SILVER SPRING, MD JUNE 17, 1989
TO ALL RADIO AMATEURS BT

New AMSAT HF Net Being Planned on 17 Meters Starting July 2, 1989

Doug Loughmiller (K05I) has announced this week that a new 17 Meter AMSAT HF Net will commence operation on Sunday, July 2, 1989 at 23:00 UTC. The frequency for this new 17M Net will be 18.155 MHz. The Net Control Stations will be K05I and John Shew (N4QQ). K05I cited the several unusual aspects of this band for introducing this new AMSAT HF Net to this newly opened band for amateur operations. One of the factors which makes this a good band for HF Net operations is the lack of QRM which makes Net operations difficult on 75M and 20M. Another aspect of the 17M band is the unusual band openings which make this band ideal for stations in Europe. So start planning to join K05I and N4QQ on 18.155 MHz on Sundays at 23:00 UTC. K05I encourages all OSCAR enthusiasts to start building simple "dipoles" and "sloper" antennas, as he did, in order to be ready for this new AMSAT HF Net on July 2nd.

+79501 B BID: 13257/VK2BBD
Path: VK3YZW!VK3AVE!VK2EHQ!VK2OP!VK4BBS!VK4XBB!VK2YDN!VK2BBD
Date: 05 Jul 89 15:17:50 L

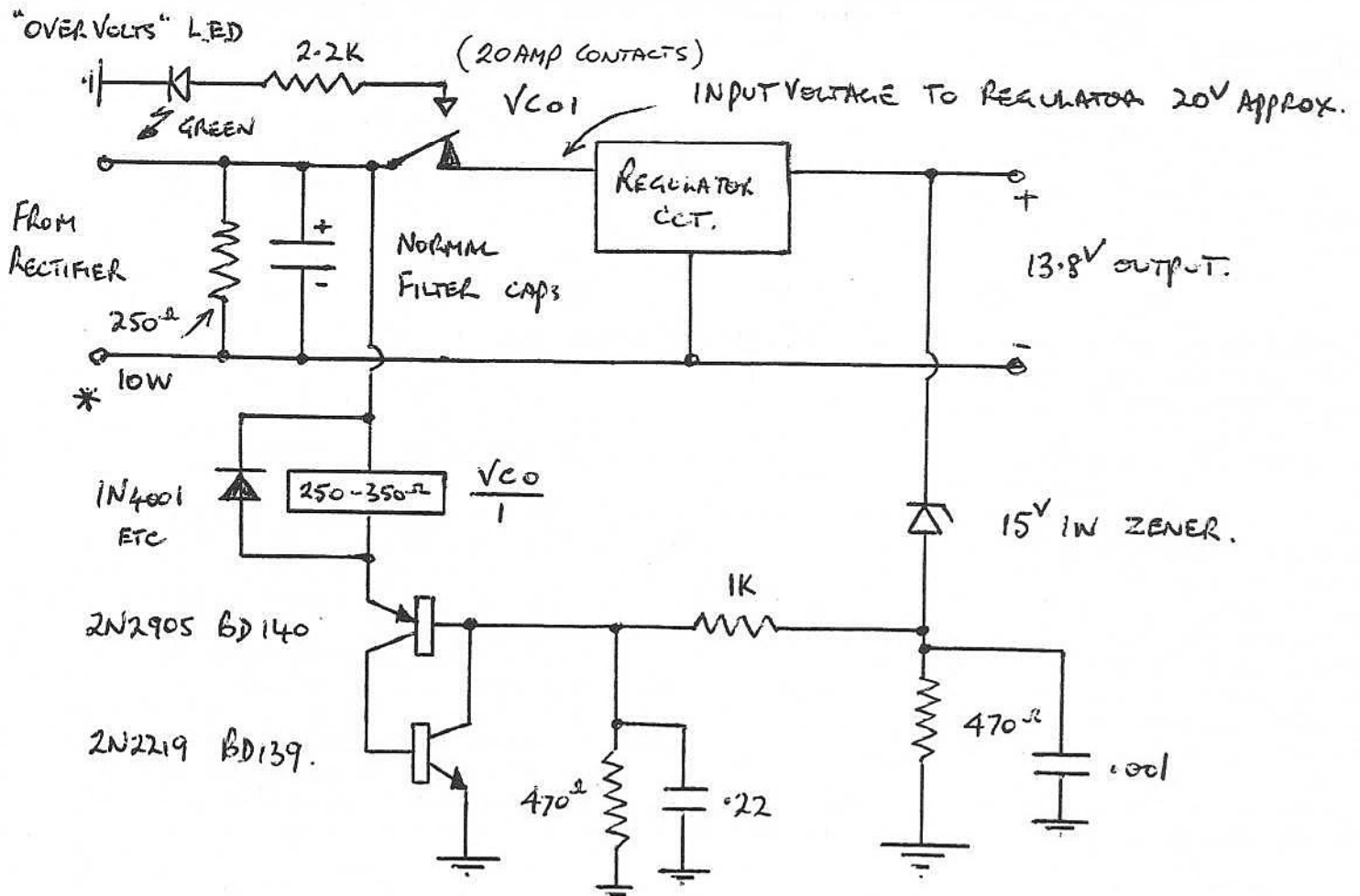
89/07 06

CHEAP INSURANCE

Bob VK3BNC

What would happen to your expensive HF or VHF rig if the output voltage of your 13.8V supply suddenly went up to 25 volts. Well it could cost lots of dollars. To fill you in, the input voltage to a series regulator type power supply which is invariably the type you have in your "you beaut" supply is a fair bit more than the output voltage. For a 13.8 volt supply it could be up to 20-25 volts and if the regulator or series pass transistors should go short circuit then that voltage will be placed across the output and hence your nice new expensive rig.

Well here is a simple circuit that will protect your equipment from just such a fault and cost you peanuts. The circuit is an "add-on" type of thing and can be constructed on a piece of veroboard in half an hour. It uses an electronic switch which is activated via a 15volt zener diode (or whatever voltage you choose) in the event that your output voltage rises to this figure due to a fault. The relay will pull in and open circuit the supply there-by protecting your equipment. The supply will remain disconnected until you turn off the mains and turn it on again. However, unplug your equipment before doing this. Investigation with a voltmeter should then follow to determine the cause of the fault. Some variation of transistors can be tried as they are not critical. The 12 volt relays are available from Dick Smith. Once wired up check for mistakes then turn it on to check its working. To test the high voltage trip circuit, first unplug any HF or VHF gear then with a shorting lead short out the regulating circuit - that is the output from the rectifier and filters to the output terminals. If all is well the relay will operate, the green L.E.D. will light and the output voltage will be disconnected. To restore circuit turn off the mains and then on again. Well, your there, it works and you can now rest knowing you have that problem out of the way.



* DON'T FORGET TO FIT 250Ω 10W RESISTOR

Packet sounds like fun. You decide to give it a try. Whether you build a kit or buy one of the available units, you finally get it to the operating desk. Now what? What do you do with it and what can you do with it? The answer is quite a bit, even if you're not the technical type.

Packet Radio

How To Work It (Not How It Works)

BY RICHARD S. MOSESON*, N2BFG

So the packet bug has bitten you—or maybe it's just nibbling at your ankle and you want to find out more about this new facet of amateur radio. You've read magazine articles and learned all about the technology, but most of the authors seem so awed by the technology that they forget to tell you what to do once you get on the air. This article will be different. It's all about packet operating—how to work it instead of how it works.

In keeping with tradition, though, I'll start with a *brief, simple* technical explanation. (I promise: no more than two paragraphs, and it won't get complicated.)

Packet radio is a fancy form of radioteletype (RTTY). It requires a personal computer or other terminal with an RS-232 output, a packet control unit (called a TNC, or Terminal Node Controller; if you want to find out what that means, find a technical article) and an amateur transceiver. The TNC plugs in between the terminal (computer) and the transceiver (radio). A disc drive and a printer are helpful, though not essential.

Packet radio gets its name from the fact that each transmission consists of a "packet" of data including the call signs of the originating station, the destination station, and any relay stations in between. It also contains the information you're sending, plus some computerese (which you never see on your screen) to let your TNC know if it has received the packet correctly.

A couple of other basic definitions:

Digipeater: A digital repeater, used for relaying packet signals. Similar in function to a voice repeater, but with a twist: It doesn't receive and transmit simultaneously, and it doesn't operate split frequency.

A packet repeater, operating simplex, "stores and forwards" your data. It receives what you send out, holds it in its memory, and when there's a clear spot on the frequency, automatically sends your packet along the way. Any packet station may be a digipeater. However, the term usually applies to those stations used exclusively as packet repeaters.

PBBS: A Packet Bulletin Board System. An electronic "mailbox," accessible by packet radio, on which users may leave messages for other people; pick up messages left for them; send (upload) and receive (download) program or text files for general use.

Connect/Disconnect: The words used on packet for making and breaking contact with another station.

ACK: A mild form of what you're likely to yell when you do something wrong. Also, an "Acknowledgement" sent by the destination station to the originating station letting it know it got the packet correctly. The originating station will send a packet or group of packets over and over again until it receives an "ACK" from the destination station.

Path: The routing of a connection that goes through one or more digipeaters. You can link several digipeaters and give yourself a path from Boston to Washington. But you'll wait quite a while to get an "ACK" from a station to which you're connected over such a long path.

EASTNET (and SOUTHWEST and TAMMNET, etc.): Established networks for linking digipeaters and bulletin boards. Maps of these networks are available on most bulletin boards. They'll help you in plotting the best path to a distant station.

Okay, enough definitions for now. We'll cover more as we go on—packet radio has its own little language—but we'll take care of them as we need to deal with them.

On The Air: Fun and Frustration

Most packet activity today is on 2 meters. The most commonly used frequencies are 145.01 (the busiest), .03, .05, .07, and .09. In addition, some areas are using 147.55 for packet communications. (Listen around in your area for the "brrrr brrrr" sound of packets flying through the air. If you hear nothing after a few minutes on 145.01, try your luck on 147.55.)

There is also some HF packet activity, mostly centered on 14.103 MHz, and the packet "establishment" is working on a 220 MHz "backbone" or "trunking" system for linking digipeaters and bulletin boards.

What's it like on the air? It's a combination of

fun and frustration—heavy on the latter for the newcomer who's just learning the ropes. The fun part is when you actually succeed in connecting with someone a couple of hundred miles away and carry on a QSO unhampered by the other stations on frequency. The frustrating part is when there are so many other stations on frequency that it takes ages (15–20 minutes, sometimes) to get a single transmission through and acknowledged. Let's look more closely at each part—the fun first.

There's virtually no interference. When you're connected with someone, your TNC will recognize and interpret only those packets addressed to you. You'll hear the others going by, but nothing will show up on your screen. Since each packet is a brief burst, there's room in between your packets for the packets of other stations. So, one frequency can support several QSOs simultaneously.

Your TNC will also ignore any packet that doesn't "add up right." Part of the coding in each packet is a "checksum" that your computer reads. If the packet is garbled in any way, the checksum will be wrong and your TNC will refuse it. (It will either do nothing or, in some TNCs, will send back a "NACK," a non-acknowledgement. So you may hear your TNC "speak," even though nothing shows up on your screen.) When the packet arrives correctly, the TNC sends back an "ACK."

This system makes your copy virtually error-free, which makes packet radio great for data transfer, either of computer programs, general information, or formal message traffic. Anyone who has ever tried to interpret garbled RTTY signals will appreciate the value of error-free communications.

Another advantage of packet radio is the use of PBBSs, which not only let you leave or pick up personal messages, and post or read general information bulletins, but also forward messages automatically from one BBS to another, even if the destination is hundreds of miles away.

Finally, there's the potential for 2 meter "DX," using a string of digipeaters to let you talk with someone a couple of hundred miles away—or, through HF/VHF gateways, a few thousand miles away.

But now come the frustrations: The same

system that guarantees you error-free copy can also drive you straight up the wall. Because if the frequency is very busy, and especially if you're going through more than one digipeater, it can take several minutes for a single transmission to get through correctly and for the ACK to get back correctly. Your TNC will keep sending the same packet(s) over and over until it receives an ACK or reaches its "retry" limit, which you program in. A multi-digipeater path complicates matters because most digipeaters can hear more than you can, so they may wait forever for a clear frequency on which to retransmit your packet.

Another problem on a busy frequency is "collisions." Two packets sent simultaneously (or nearly so) can bump into each other and result in both being garbled. They'll both be resent, but on a busy frequency it often takes many "retries" before a packet will get through intact.

If you live in or near a big city, or in any area with a lot of packet activity, you're bound to encounter an overcrowding problem on 145.01. Severe overcrowding reduces "throughput," a fancy word meaning information that gets through. There are two major causes of this overcrowding:

(1) Competition between rag-chewers and bulletin boards. Trying to hold a QSO on the same frequency as a PBBS that's dumping a 12K file to someone is nearly impossible. The BBS goes on seemingly forever, and you can't get a packet in edgewise.

On the other side of the coin, lots of QSOs going on can reduce the "throughput" of the BBS, making it have to repeat material several times. The problem is the worst during evening hours—"prime time." But it can be just as bad at "off-peak" hours, since those are used by the BBSs to forward messages from one to another.

Implementation of a 220 MHz "backbone" system for linking BBSs will help relieve some congestion, but full implementation is still a long way off. One way to relieve this pressure is to refrain from "uploading" or "downloading" lengthy files during prime time.

(2) For any type of long-distance QSO, there's no practical alternative to 145.01. Other frequencies are in use, and many have digipeaters operating on them. But so far only .01 has the network of linked digipeaters that makes long-distance connections possible.

If you live outside an active packet area, you might encounter just the opposite problem—nobody to talk to. Particularly if you're limited to VHF, as most TNCs are (because the tones and the data transmission [baud] rate are different on HF), you're dependent on the presence of digipeaters—or nearby stations through which you can digipeat—in order to talk with anyone outside your immediate local area.

If these aren't available, you'll be "braaaping" away to yourself. (This probably won't stay a problem for long, as prices of TNCs are dropping quickly and sharply.) If there isn't much packet activity where you live, get a friend to buy a TNC when you do. You'll have each other to talk with, and as other amateurs come to see what it's all about, the problem will solve itself.

Operating Practices

There's one other primary cause of frustration in operating packet: poor operating practices, and—for people trying to learn the proper way to do things—no readily available

source of information on good operating practices.

It is hoped that this article will eliminate the latter part of that problem and help with the first part.

The first step in developing good operating practices comes before ever going on the air. It's vital to understand and properly set the assorted parameters that determine the nature of what you send out and what you see on your screen or printer. This requires learning a whole new language (just as you did when you first got into amateur radio).

My TNC (the AEA PK-64) has some four dozen different parameters, but don't worry. I'll just cover the most important ones here. (Unfortunately, different TNCs have different names for some parameters. I've tried to list all possibilities, but if you can't find something I mention here, dig a little deeper.)

First and foremost, before you do anything else, and especially before you go on the air, set "MYCALL." It tells the TNC your callsign, which sets your station ID on each transmission. I got a call this morning from "He'd forgotten to plug in his call and my screen said "Conn to " I had no idea who I was talking to. Most TNCs let you abbreviate the command as MY, so all you have to type is "MY (your call)," then hit return.

ACKS and FRACKS

While some commands and parameters are in fairly plain English (Connect, MYCALL, etc.), others are pure computerese. We've already covered ACK. But you also need to know about FRACK, DWAIT, PACLEN, and MAXFRAME. (For others, such as AXHANG and LCOOK, you'll have to check your TNC manual.)

FRACK is short for Frame Acknowledge. Packet pioneer Doug Sharp, WB2KMY (known in the east as "Pacman"), explains that FRACK "tells your TNC how long to wait for an acknowledgement before doing a retry. If it sends out a retry too quickly, you run the risk of crashing into your own acknowledgement—especially if you're using multiple digipeaters." While many TNCs come with the FRACK set at 3 or 4, Doug suggests setting it at 6 or 7.

DWAIT, says Doug, "essentially tells the TNC how long the frequency must be clear before sending a packet." Generally, each unit is 40 milliseconds, and Doug recommends setting DWAIT at a minimum of 2, possibly even 3 or 4. (You'll never notice those missing milliseconds.) The TNC 2 and its clones provide 10 milliseconds per DWAIT unit. If you have one of those multiply by 4. And even if it eventually adds up to four or five whole seconds extra, "your waiting five extra seconds," says Doug, "saves each of your neighbors waiting an extra minute."

Equally important are PACLEN and MAXFRAME. PACLEN sets the length of each packet (anywhere from 0 to 255 bytes). My TNC came set at 128—meaning that each packet contains 128 bytes of data. And as you're typing, each time that limit is hit, the TNC automatically sends out what you've typed so far. (If you finish a message before hitting the PACLEN limit, hit "return" and what you've written will be sent.)

Sharp says he's found 128 is a good average length, but in crowded situations you'll do better to drop your PACLEN to 64 or even 16. On a busy frequency short packets have a better chance at getting through than do long ones. In my early days on packet I dropped my

PACLEN from 128 to 40 (one screen line) and increased my "throughput" dramatically. I now keep it around 64.

MAXFRAME works together with PACLEN, determining how much goes out on the air, and how quickly. MAXFRAME is the maximum number of packets (frames) your TNC will send out before getting an ACK. For example, a MAXFRAME of 4 means your TNC will send out a maximum of four unacknowledged packets. It'll keep sending those four until it gets an ACK. If there's more to send, the TNC will wait until it receives an ACK for the first four, then send out four more.

This, by the way, won't affect your typing. Waiting material will be held in a buffer and sent out in turn. The rule of thumb, says Sharp, is "when things get rough, shorten things up."

WB2KMY's Guidelines

	Avg. QSO (uncrowded freq)	File Xfer (uncrowded freq)	Crowded Freq. (esp. evenings)
FRACK	7	7	7
DWAIT	3	2	4
PACLEN	128	256	64 (or less)
MAXFRAME	4	7	2

Other parameters, such as TXDELAY (which sets the length of time your TNC waits after keying up the transmitter to send data), depend on your individual rig. Experiment.

RETRY is also important. When you're connected with someone, your TNC will send the same packet over and over again until it reaches an ACKnowledgement or reaches its RETRY limit. When the TNC "retries out," disconnects your station. TNC-1s and their clones will then give up and wait for your instructions. Newer TNCs will automatically try to reestablish the connection. If it can't be done in a certain number of tries, the newer TNCs will give up, too.

The RETRY parameter can be set at any value from 0 to 15. The busier your area is, the higher you'll have to set the number. The exception is 0 (zero). That turns off the counter—and the TNC will try forever, until it gets an ack or you manually disconnect. (We'll have more on that later.)

One parameter which affects only incoming signals—but which can be very useful—is MONRPT (perhaps abbreviated differently on different TNCs). It stands for MONITOR REPEATER. When it's off, your screen displays only the callsigns of the sending and receiving stations. Turning on MONRPT displays the "path" by which the message is routed—listing all the digipeaters in the path and putting a * or some other symbol next to the one you're hearing. This helps you see which stations you can copy directly, and determine the best path to use to connect with other stations. (This feature is not available on the TNC-1 and its clones.)

And that brings us to the last off-air "good operating practice": listen (watch, actually). See who's on the air, who you can copy directly, whether your local PBBS is busy, etc. It's amazing what you can learn about operating practices in your area simply by observing what other people are doing.

If you listen and hear packet bursts, but nothing is coming onto your screen, check your volume level. The receive volume should be just loud enough to "decode," to solidly light up the DCD light on your TNC. If it's too loud, it'll distort and garble the signals. Transmit levels (monitored on another radio) should

be, as Doug Sharp puts it, "just loud enough to be irritating."

Operating Practices: On Air

Transmitting on packet is different from just about any other mode. For starters, there's no manual transmit/receive switch. As you type and reach your PACLEN limit, a packet is *mitted automatically*. You can manually send something by hitting RETURN. But your rig automatically returns to receive after the packet is sent.

Your transmitter may also turn on all by itself periodically and send something out that doesn't show up on your screen. Chances are, it's one of three things: (a) a retry on a packet already sent once; (b) an ACK or NACK (not acknowledged) in response to a received packet; or (c) signals from another station, being digipeated through yours.

Each TNC can be switched between three different operating modes: Command (CMD), Converse (CONV), and Transparent (TRAN). The TNC normally comes up in the CMD mode, meaning that anything you type will be seen by the TNC as a command. It is not sent out on the air.

What you see on your screen is determined by a couple of other parameters. In order to "read the mail," or copy all packets you can hear, make sure that MONITOR and MALL (Monitor All) are both set to ON. (Some newer software replaces these two "toggles" with a single MONITOR parameter which can be set at any value from 0-6. Set it at 2 or higher to "read the mail." I leave mine set at 3.)

As soon as you're connected to someone, the TNC switches into the CONV mode. Here, whatever you type on the keyboard is sent out

on the air to the other station, and the TNC ignores any incoming packets from other stations. Plus, it strips off the callsign info from packets headed your way, so all that appears on the screen (or printer) is the message text. (This feature can be changed, by turning on the MONCON or MCON parameters, to let you monitor other packets while connected to someone.) In order to DISCONNECT, you have to switch back into the CMD mode.

The third mode is TRANSPARENT. This passes all properly sent or received data without trying to interpret it. Basically, it's used to transfer programs and binary files which may have commands embedded in them—without having the TNC or the computer try to follow those commands.

On some TNCs it's difficult or impossible to get out of the TRAN mode without shutting the unit off and turning it back on again. That's because you've told it to ignore all commands, so it won't listen when you tell it to do something different. (Remember, these machines aren't smart; just fast.)

Making Contact

Calling a station (or "connecting") on packet is easy. To initiate a contact tell the TNC "Connect to (callsign)." Or abbreviate it "C (callsign)." If you can't connect directly and need to go through one or more digipeaters, add the "via" command. For example, when I connect to the W2VY-1 BBS, I go through the N2DSY-2 digipeater. So I type "CW2VY-1 V (or VIA) N2DSY-2." I need an extra hop (and a different path) to connect to WA2RKN's BBS. So I type "CW2RKN-2 V WB2VUK, WB2KMY-1." I know WB2VUK has a direct shot to the

WB2KMY digipeater, so—even though he's not officially a digipeater—I connect through him to KMY-1 and on to the BBS.

By now, you're probably asking, "What are all those funny numbers after people's callsigns and what do they mean?" They're known as callsign extensions or SSIDs, or Secondary Station IDs. Since you're not permitted to use the same callsign for two or more stations operating simultaneously from different places—and since digipeaters are not repeaters in the true sense—the system of SSIDs was developed to differentiate separate stations operating under the same callsign. The packet "protocols" allow for up to 15 SSIDs.

Unfortunately, there's no agreement on how to assign the numbers. The only agreement is that "-0" is assumed on a call without an SSID, and that that's generally used for the individual amateur operating his own packet station. But that's not always true either.

AI2Q runs a bulletin board under just his callsign. If you want to talk to him, you connect with AI2Q-1. The Ramapo Mt. ARC in New Jersey operates a PBBS, WA2SNA-1, and a digipeater, WA2SNA-2. But if you go north a little way, Mount Beacon (NY) ARC's digipeater is WB2KMY-1 and its PBBS is WA2RKN-2. ARRL Headquarters has its BBS, W1AW-4, accessible through its digipeater, W1AW-5. And along the way you find the KG1Q-9 digipeater.

It's thoroughly confusing and there's no sign that the packet community is about to agree on any convention for SSIDs. Just watch the stations in your area to see which ones use which SSIDs for what purposes. And try not to get too confused. Doug Sharp, WB2KMY, tells of a newcomer who tried to connect with him for a couple of weeks, but kept getting busy sig-

nals—because he was trying to connect with WB2KMY-1, the digipeater. And there was no one there to respond.

As for your own ID, one of the great things about packet is that you don't have to consciously send one. Your TNC does it for you—every time it sends out a packet. As this is generally your only form of ID, and it's read by the TNCs of receiving stations and bulletin boards, it's essential that you set the MYCALL command on your TNC before going on the air.

One other thing: If your TNC has a CW ID, turn it off and leave it off. A CW ID is no longer required by FCC rules, and using it only creates clutter.

Okay, your callsign and other parameters are set, and you're ready to go on the air and call CQ. Well, it's not as easy as typing "CQ CQ CQ from N2BFG," as you might on regular RTTY. The best way is to use your UNPROTOCOL mode, which sounds complicated, but simply means your packets are not directed to anyone in particular.

The unprotocol "destination" is set with the UNPROTO command (abbreviated U). Most stations set this as CQ. Others use TEST. Some BBSs use QST or MAIL (followed by a listing of stations with messages waiting). To set the UNPROTO "destination," enter the command mode and type U (DESTINATION). (You can also program in a digipeater, as: U CQ V (CALLSIGN) to have your UNPROTO message sent through your local digi.)

If your TNC provides message buffers, type your CQ message into one of them (example: CQ from N2BFG, Rich in N. Tarrytown, NY). This will save you from typing the same message over and over again. Next, enter the CONVERSE mode (by typing CONV) and send

your message. Repeat occasionally until you get an answer. There's no need to send more than one or two CQs in a minute, and if you don't get a response, there's no point in sending an endless string. Wait a few minutes and try again. Don't abuse the CQ.

Some stations use their BEACONS to call CQ. When there were very few packet stations on the air, beacons were often left on all the time to let other people know you were out there, and that your station was available for digipeating. Today, though, the network of full-time digipeaters has grown to the point where constant beacons are unnecessary and do nothing more than clutter the frequency.

The big problems with using your beacon to call CQ are clutter and the fact that it's all too easy to leave it on after someone connects with you. That results in your continuing to call CQ while you're in QSO. And by all means, never leave a beacon on when you leave the shack.

There's very little that's more annoying than responding to a CQ and getting a busy or, worse yet, a "connect message" saying "I'm not here now; please leave a message and call back later." If you're not there, then why are you calling CQ?!! I don't know about you, but I like to talk to people, not to machines. And if I see someone calling CQ, I expect that person to be there, in person, to answer my call.

A simple rule on beacons: Don't use them. Call CQ manually—and sparingly.

Now, what's a "connect message"? It's a brief message that you type in once (using the CTEXT command) and that can automatically be sent to anyone who connects with you. (It's toggled on and off with the CONMSG parameter.) Some connect messages are simple,

such as "Hi from Rich in N. Tarrytown, NY," that can save you retyping redundant greetings. But since most CQ messages say something like "CQ from N2BFG, Rich in N. Tarrytown, NY," it's redundant anyway.

So many people use their connect messages like the message tapes on answering machines: "I can't come to the TNC right now, so please leave a message, then disconnect." Messages like these are handy if you're going away for a while, but are leaving the TNC on. Your receive buffer will be happy to take a message for you.

The message here, though, on the connect message, is to use it sparingly. Turn it on when you're away from the shack or don't want to get involved in a QSO. But when you're sitting there looking for a ragchew, shut it off.

Talk To Yourself

My first packet QSO was with myself! I wanted to find out if I could make it to my local digipeater. Since the digipeater doesn't start transmitting until you're finished sending, you can monitor your own signals being digipeated. And you can connect with yourself! It's an excellent way to check a path or to determine whether a particular digipeater is on the air. Don't have long conversations with yourself, though. When you're satisfied you have a good link, disconnect.

When you've finally made contact with someone, the object is to carry on a good QSO. Presuming your signals are getting through okay and your packets are being "ACKED" with some reasonable regularity, you stand a reasonably good chance of succeeding.

One interesting facet of packet communications is that while you may sit and wait for the person you're talking with to finish typing, you may also carry on a semi-duplex QSO.

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Since the TNC automatically sends out a packet whenever the PACLEN is reached, you can have a partial comment on your screen for 20 or 30 seconds (or more) before the rest of the message comes in. There's nothing to stop you from responding to what you see—or talking about something completely different—while waiting for the other guy to finish his piece. It's a bit disconcerting at first, since you can end up carrying on two different QSOs at the same time with the same person, and some people don't like it. But others find it to be great fun.

One big question faced by novice packeteers is, "How do I know when the other guy's finished sending?" After all, there's no exchange of IDs and no need for a "back to you," especially if you're both talking at once. The convention that's been adopted for "end of transmission," at least in the east, is two or three angle brackets, ">>" or ">>>". Until you see the brackets, you can assume there's more to come.

A few paragraphs back I mentioned "busy signals." When you try to connect to someone who's already connected to someone else, his TNC will respond with a "busy." Your screen will print "(CALLSIGN) BUSY-DISCONNECTED." At the same time a line will appear on the other person's screen, saying, "CONNECT REQUEST FROM (YOUR CALLSIGN)." So, he knows you're looking for him and he can call you when he's done.

Some newer TNCs contain provisions for multiple connects. Mine will let you talk with up to ten stations simultaneously. (You set the maximum with the CONMAX command.) Each QSO is taken in on a different "channel," letting you conclude an exchange with one per-

son before looking to see what the other person has sent.

This can be lots of fun, but I'd recommend it only to someone who's already comfortable with general packet operating. Otherwise, it's just too confusing.

Even though many TNCs limit you to one connection at a time, it is still possible to conduct a net or roundtable. Again, it's probably best to wait until you're familiar and comfortable with the regular operating techniques before trying this.

A net operation is pretty easy if the net control has a TNC capable of multiple connects. Then each person connects with the NCS, making him the center of a "star." But while net members can monitor what others are saying (by turning their MONCON or MCON parameter on), they can only talk directly to net control. If they're passing traffic, they'd have to disconnect and then connect with each other off frequency.

Another way of having a group QSO is by using the UNPROTO mode. (See previous section on calling CQ.) In this way nobody's connected to anyone in particular, and all can see what each is sending. If any two stations want to pass traffic, they can move off frequency and connect to each other.

The only problem with the UNPROTO mode is that since you're not connected to anyone, you can't get ACKs, so each packet is sent only once and you have no assurance that any of them are getting through.

Ed. Note: IN VK3, KK IS USED, INSTEAD OF BRACKETS

Ending The QSO

When you're done talking with someone you can't just shut off your rig and walk away. Well, you could, but the other person's TNC would still think it was connected to yours. Ending a QSO properly requires a DISConnect. Doing it is rather simple. Return to the command mode, type D, hit return, and wait while your TNC does the rest. You're not disconnected until the TNC says you are. In order to complete a disconnect, your DISC request has to be properly received by the other station, and your TNC has to receive its acknowledgement. Only then does your status change from "DISC in progress" to "DISCONNECTED."

Now there is a thing called a "Unilateral Disconnect." And you do it by sending two disconnect commands in a row. This will immediately put you in a DISCONNECTED state, but it leaves the other station hanging. You should only use this when you know the other station has already disconnected from you, or if you know the path is lost (i.e., if the digipeater you're using goes off the air).

One other time that you can get away with using a unilateral disconnect is when you're switching to another path. This has to be done pretty quickly. What you do is send two disconnects, then immediately send a connect request to the same station via a different path. Generally, a TNC will accept a connect request from a station to which it thinks it's already connected, and it won't give you a busy.

The Automatic Station

Many people think that one of the greatest things about packet is that you don't have to be at your station for someone to connect with you and leave a message. These folks leave their TNCs on full-time, and when they're not there in person, leave them on automatic—set up to receive only messages directed to that station.

They leave their CONMSGs turned on to send out their "I'm not here" message. Connecting stations then leave a message and disconnect. This is great and, as of a recent FCC ruling, it's also legal. (Before that, automatic operation of stations other than repeaters and satellites had been illegal below 220 MHz. The new rule permits automatic operation anywhere above 50 MHz.)

Here's how to do it: First, make sure you're in the command (CMD) mode. Next, set your MONITOR to OFF or 0 (zero). (As long as you leave your CONOK parameter set to ON, your TNC will automatically respond to a connect request, even if the MONITOR is off.) Now, only those messages sent to you during a connected QSO show up on your screen or printer.

Next, turn on your Connect Message (CONMSG), making sure the text reads as you want it to, and go away. Your TNC will connect to anyone who wants to talk to you, send them the message that you're not around, and let them leave you a message. When you return, you can look through your buffer and see who has left messages (or, if you've left your printer on, you'll have hard copy).

This system is great if you want to leave your TNC, computer, and radio turned on at all times. For those who don't, there is another way to leave messages—Packet Bulletin Board Systems (PBBs).

Using PBBs will be the topic of another article, along with a look at packet's future. 

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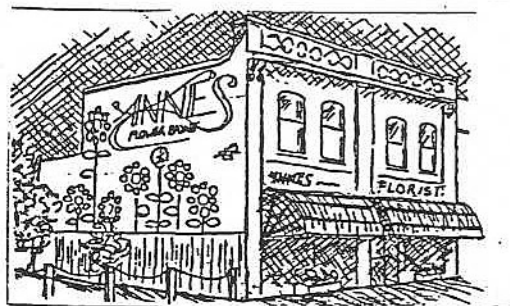
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